# An electron beam detector for the FLASH I beam dump.

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## Introduction

After the generation of the laser light, a dipole deflects the highly energetic electron beam of FLASH (Free Electron Laser Hamburg) into a dump. A detector is developed to monitor the position, dimensions and profile of the electron beam. Scintillation light is emitted due to the electrons hitting a luminescent screen (Chromox) located in front of the dump aperture. This light is guided by an optical system external to the vacuum to a CCD camera for optical analysis of the generated image. Two different optical systems will be installed redundantly: a conventional lens-mirror-system and a system based on radiation-hard optical fibres.

	electron			luminescent		
dipole		beam	diagnostics	screen		
١	FEL beam	١	chamber	/		

#### Vacuum mirror

- located at diagnostics chamber
- beam spot image through reflects vacuum window
- GLIDCOP AI15 (sintered copper alloy)
  - → decent optical qualities
  - → good thermal conductivity
- if hit by electrons: ability to quickly dissipate heat into the environment
  - $\implies$  soldered directly onto flange





## **Optical system**







- biconvex collective lenses •
- borosilicate crown glass with • antireflective coating

#### Fibre optic bundle

- Schott AG
- Radiation hard
- Format size: 4x4 mm<sup>2</sup>
- Transmission: 40 %
- Single fibre ø: 60 µm
- 6x6 arrays

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### Lens-mirror-system





#### **Optical deterioration test setup**



#### Fibre optic bundle





